

# PQ015YZ5MZ Series/PQ015YZ01Z Series

Low Voltage Operation, Low Power-Loss Voltage Regulators (SC-63 Package)

## Features

- Low voltage operation (Minimum operating voltage: 1.7V)  
1.8V input → available 1.0 to 1.5V output
- Variable output voltage type
- Surface mount package (equivalent to EIAJ SC-63)

## Applications

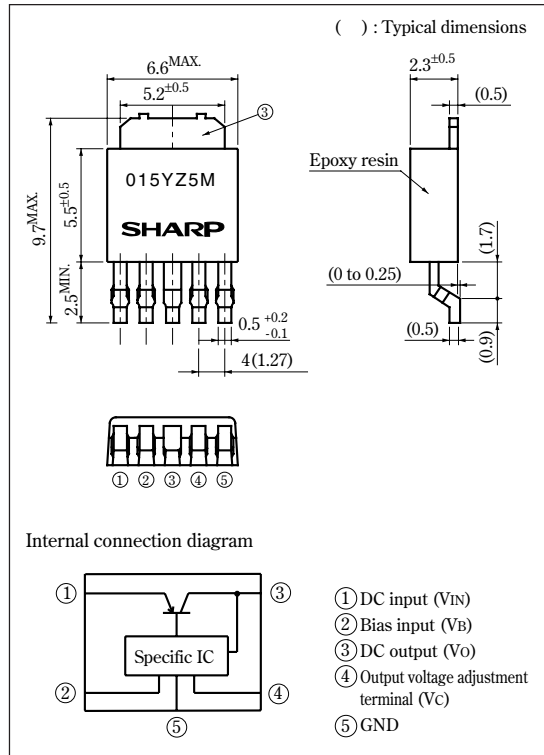
- Personal computers, power supply in peripherals
- Power supplies for various electronic equipment such as DVD player or STB

## Model Line-up

| Output current (I <sub>o</sub> ) | Package type | Variable output    |
|----------------------------------|--------------|--------------------|
| 0.5A                             | Taping       | <b>PQ015YZ5MZP</b> |
|                                  | Sleeve       | <b>PQ015YZ5MZZ</b> |
| 1A                               | Taping       | <b>PQ015YZ01ZP</b> |
|                                  | Sleeve       | <b>PQ015YZ01ZZ</b> |

## Outline Dimensions

(Unit : mm)



## Absolute Maximum Ratings

(T<sub>a</sub>=25°C)

| Parameter                                      | Symbol            | Rating      | Unit |
|------------------------------------------------|-------------------|-------------|------|
| *1 Input voltage                               | V <sub>IN</sub>   | 3.7         | V    |
| Bias supply voltage                            | V <sub>B</sub>    | 7           | V    |
| *1 Output adjustment terminal voltage          | V <sub>ADJ</sub>  | 5           | V    |
| Output current                                 | PQ015YZ5MZ series | 0.5         | A    |
|                                                | PQ015YZ01Z series | 1           |      |
| *2 Power dissipation (with infinite heat sink) | P <sub>D</sub>    | 8           | W    |
| *3 Junction temperature                        | T <sub>J</sub>    | 150         | °C   |
| Operating temperature                          | T <sub>opr</sub>  | -25 to +85  | °C   |
| Storage temperature                            | T <sub>stg</sub>  | -40 to +150 | °C   |
| Soldering temperature                          | T <sub>sol</sub>  | 260 (10s)   | °C   |

\*1 All are open except GND and applicable terminals

\*2 P<sub>D</sub>: With infinite heat sink

\*3 Overheat protection may operate at T<sub>J</sub>=125°C to 150°C

• Please refer to the chapter " Handling Precautions ".

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■ Electrical Characteristics

(Unless otherwise specified, condition shall be (PQ015YZ5MZ))

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| Parameter                                    | Symbol                          | Conditions                                                                    | MIN.                | TYP. | MAX. | Unit |
|----------------------------------------------|---------------------------------|-------------------------------------------------------------------------------|---------------------|------|------|------|
| Input voltage                                | V <sub>IN</sub>                 | On condition that 1.0V ≤ V <sub>o</sub> ≤ 1.2V                                | 1.7                 | -    | 3.7  | V    |
|                                              |                                 | On condition that 1.2V ≤ V <sub>o</sub> ≤ 1.5V                                | V <sub>o</sub> +0.5 | -    | 3.7  |      |
| Bias supply voltage                          | V <sub>B</sub>                  | -                                                                             | 2.35                | -    | 7    | V    |
| Output voltage                               | V <sub>o</sub>                  | -                                                                             | 1.0                 | -    | 1.5  | V    |
| Load regulation                              | R <sub>regL</sub>               | I <sub>o</sub> =5mA to 0.5A                                                   | -                   | 0.2  | 1    | %    |
|                                              |                                 | I <sub>o</sub> =5mA to 1A                                                     | -                   | 0.2  | 1    |      |
| Line regulation                              | R <sub>regI</sub>               | V <sub>IN</sub> =1.7 to 3.7V, V <sub>B</sub> =2.35 to 7V, I <sub>o</sub> =5mA | -                   | 0.2  | 1    | %    |
| Ripple Rejection                             | RR <sub>1</sub>                 | Refer to Fig.2                                                                | -                   | 65   | -    | dB   |
|                                              | RR <sub>2</sub>                 | Refer to Fig.3                                                                | -                   | 60   | -    | dB   |
| Reference voltage                            | V <sub>REF</sub>                | -                                                                             | 0.97                | 1    | 1.03 | V    |
| Temperature coefficient of reference voltage | T <sub>c</sub> V <sub>REF</sub> | T <sub>j</sub> =0 to 125°C, I <sub>o</sub> =5mA                               | -                   | ±0.5 | -    | %    |
| Bias inflow current                          | I <sub>B</sub>                  | -                                                                             | -                   | 1.5  | 3    | mA   |

Fig.1 Test Circuit

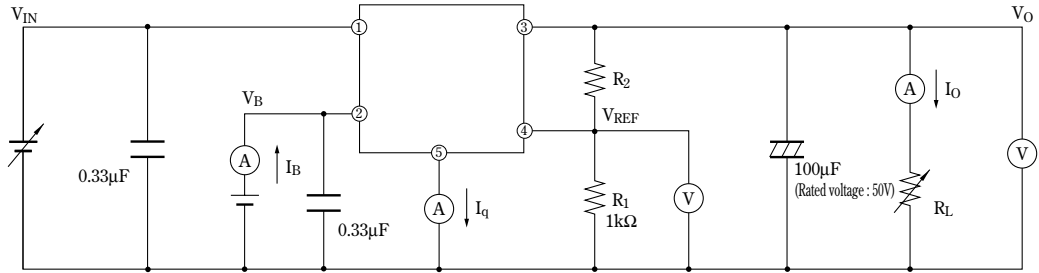


Fig.2 Test Circuit for Ripple Rejection (1)

$$V_o = V_{REF} \times (1 + R_2/R_1)$$

$$[R_1 = 1k\Omega, V_{REF} \approx 1.0V]$$

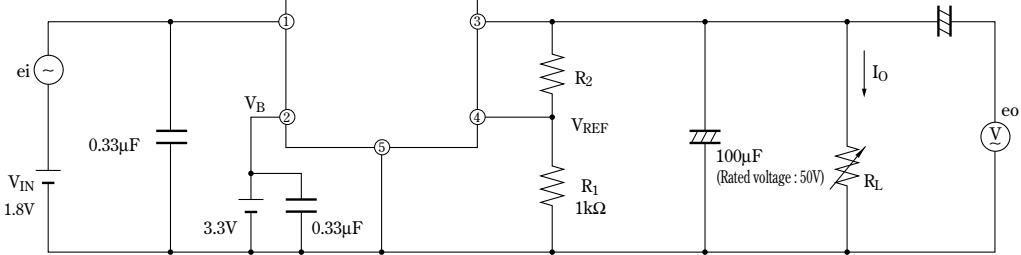


Fig.3 Test Circuit for Ripple Rejection (2)

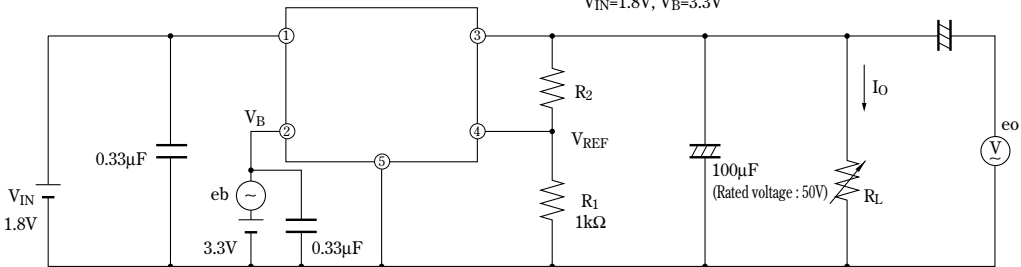
$$f = 120\text{Hz (sine wave)}$$

$$e_i(\text{rms}) = 0.1\text{V}$$

$$V_{IN} = 1.8\text{V}, V_B = 3.3\text{V}$$

$$I_o = 0.3\text{A}$$

$$RR = 20\log(e_i(\text{rms})/e_o(\text{rms}))$$



$$f = 120\text{Hz (sine wave)}$$

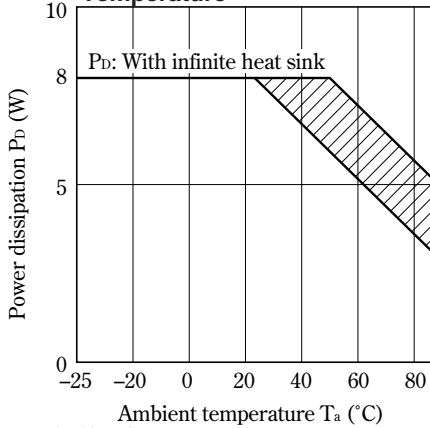
$$e_b(\text{rms}) = 0.1\text{V}$$

$$V_{IN} = 1.8\text{V}, V_B = 3.3\text{V}$$

$$I_o = 0.3\text{A}$$

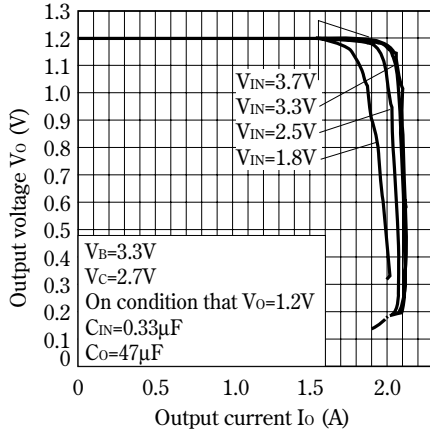
$$RR = 20\log(e_b(\text{rms})/e_o(\text{rms}))$$

**Fig.4 Power Dissipation vs. Ambient Temperature**

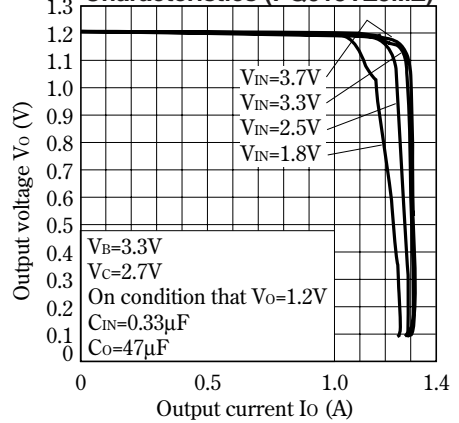


Note) Oblique line portion: Overheat protection may operate in this area.

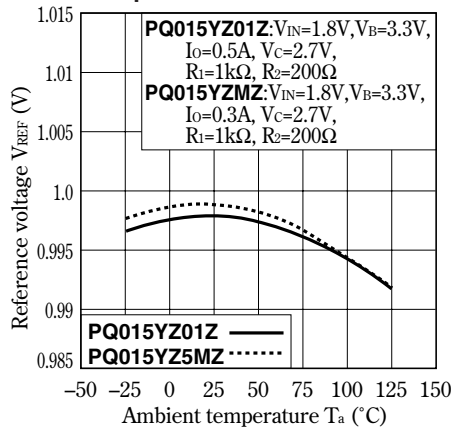
**Fig.6 Overcurrent Protection Characteristics**



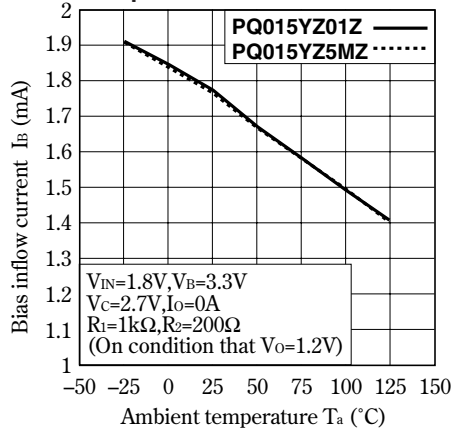
**Fig.5 Overcurrent Protection Characteristics (PQ015YZ5MZ)**



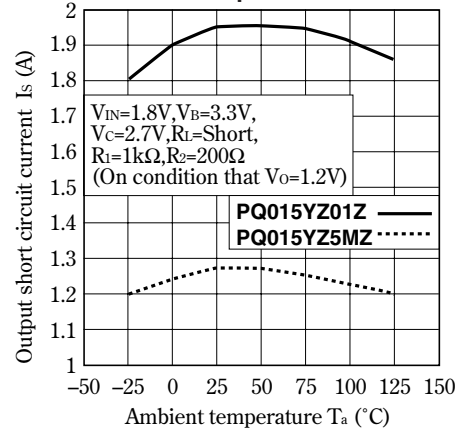
**Fig.7 Reference Voltage vs. Ambient Temperature**



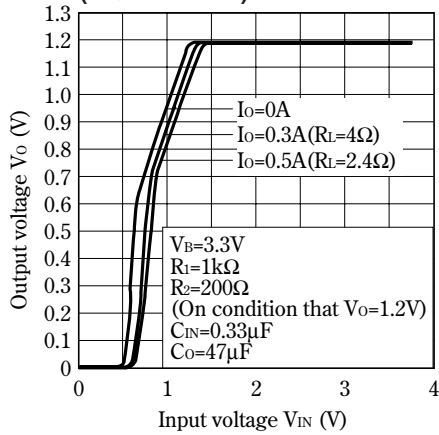
**Fig.8 Bias Inflow Current vs. Ambient Temperature**



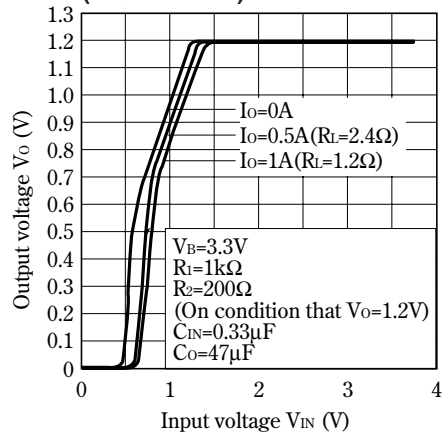
**Fig.9 Output Short circuit Current vs. Ambient Temperature**



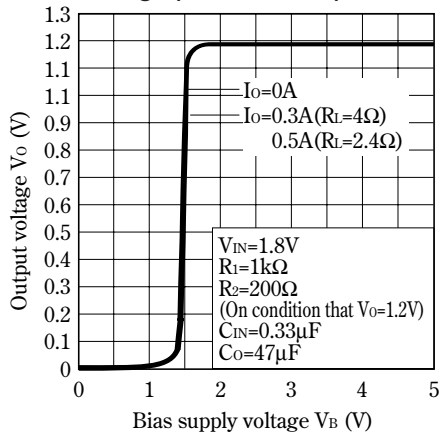
**Fig.10 Output Voltage vs. Input Voltage (PQ015YZ5MZ)**



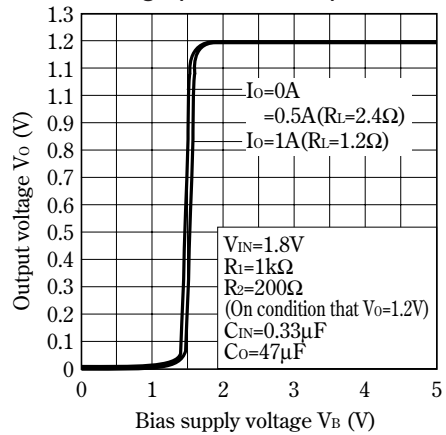
**Fig.11 Output Voltage vs. Input Voltage (PQ015YZ01Z)**



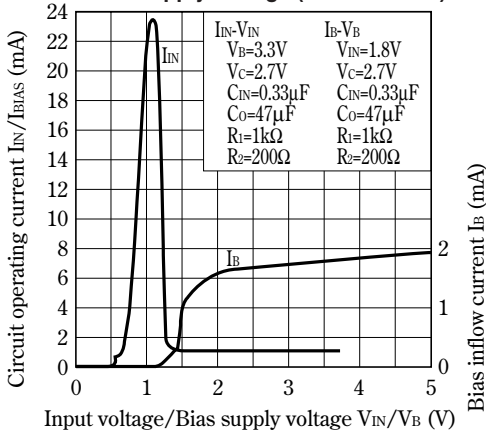
**Fig.12 Output Voltage vs. Bias Supply Voltage (PQ015YZ5MZ)**



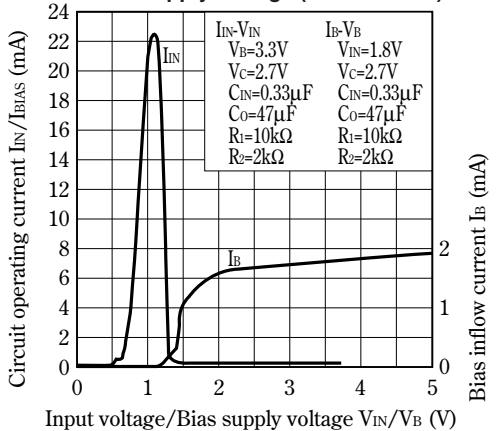
**Fig.13 Output Voltage vs. Bias Supply Voltage (PQ015YZ01Z)**



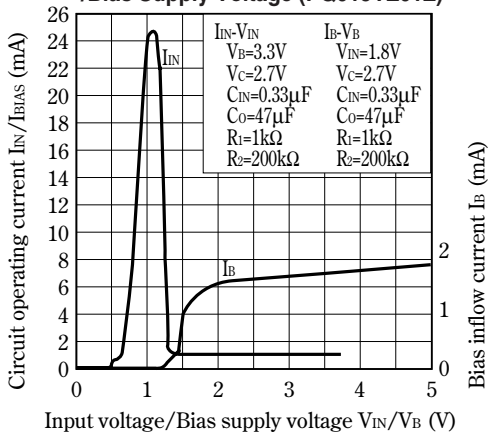
**Fig.14 Circuit Operating Current vs. Input Voltage /Bias Supply Voltage (PQ015YZ5MZ)**



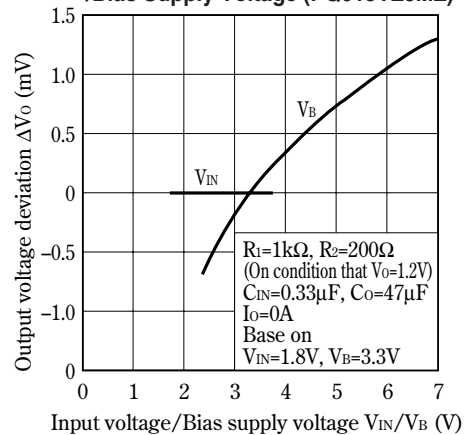
**Fig.15 Circuit Operating Current vs. Input Voltage /Bias Supply Voltage (PQ015YZ01Z)**



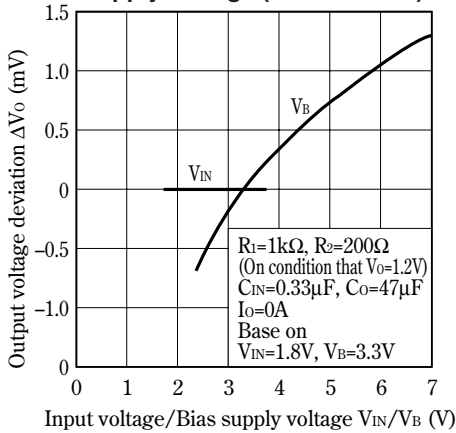
**Fig.16 Circuit Operating Current vs. Input Voltage /Bias Supply Voltage (PQ015YZ01Z)**



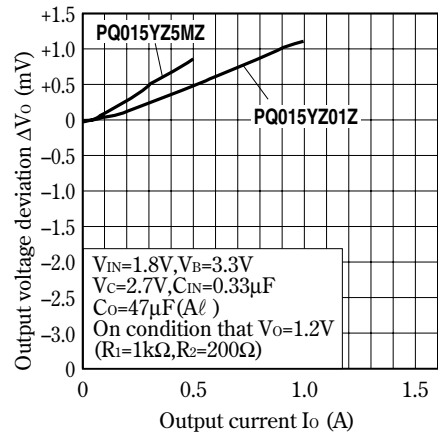
**Fig.17 Circuit Operating Current vs. Input Voltage /Bias Supply Voltage (PQ015YZ5MZ)**



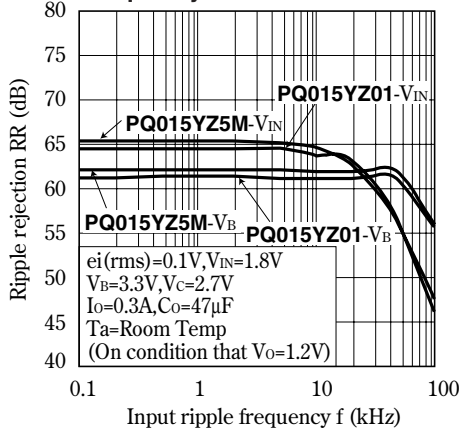
**Fig.18 Output Voltage vs. Input Voltage/Bias Supply Voltage (PQ015YZ01Z)**



**Fig.19 Output Voltage vs. Output Current**



**Fig.20 Ripple Rejection vs. Input Ripple Frequency**



**Fig.21 Ripple Rejection vs. Output Current**

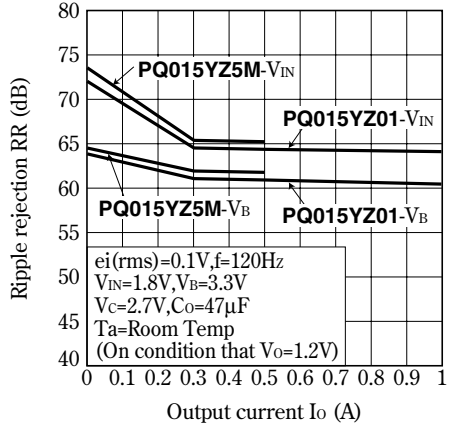


Fig.22 Typical Application

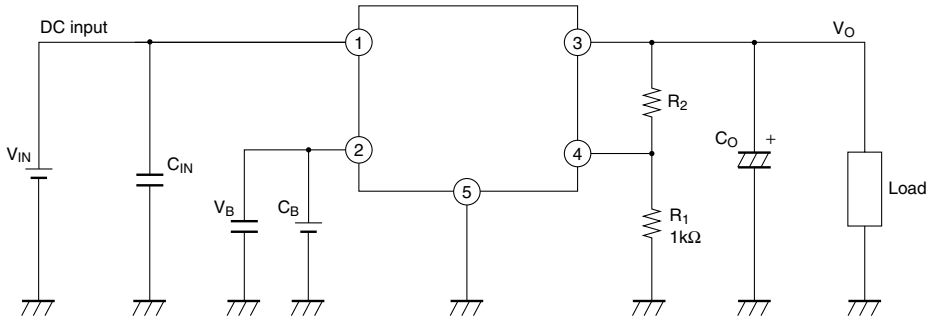
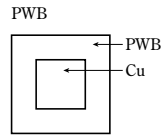
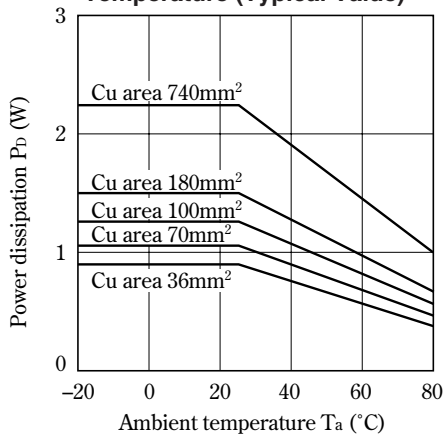
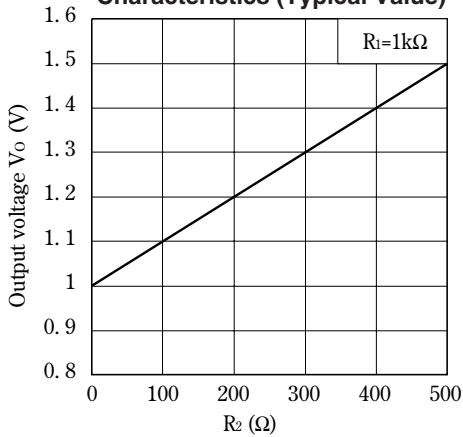


Fig.23 Power Dissipation vs. Ambient Temperature (Typical Value)



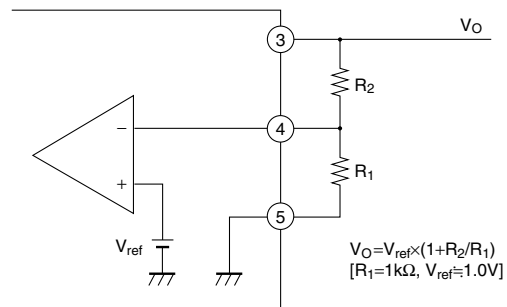
Material : Glass-cloth epoxy resin  
 Size : 50×50×1.6mm  
 Cu thickness : 35μm

Fig.24 Output Voltage Adjustment Characteristics (Typical Value)



### ■ Setting of Output Voltage

Output voltage is able to set from 1.0V to 1.5V when resistors  $R_1$  and  $R_2$  are attached to ③, ④, ⑤ terminals. As for the external resistors to set output voltage, refer to the figure below and Fig.24.



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